NEST SITE SELECTION OF THE AMERICAN KESTREL (Falco sparverius)

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The purpose of this study is to compare physical characteristics of active American Kestrel (*Falco sparverius*) nests with those of unused (available) woodpecker cavities in order to evaluate Kestrel nesting preferences. The secondary purpose is to compare Kestrel nests in trees with those in buildings.

Study area and methods

Eighteen Kestrel nests (10 in woodpecker cavities and 8 in buildings) were identified in Nittany Valley, Centre County, PA during 1980 and 1981. Nest sites were found by observing Kestrels using cavities and by direct observation of eggs and nestlings. To compare used and unused sites, 70 woodpecker cavities were randomly sampled within 7 Kestrel home ranges. The following were recorded: 1) height of entrance hole (cm), 2) width of entrance hole (cm), 3) orientation of entrance hole (degrees clockwise from north), 4) distance of hole from ground level (m), 5) tree diameter at entrance (cm), 6) tree diameter at breast height, dbh (cm). Statistical comparisons were done using Wilcoxon Rank Sum two-sample test for median differences (p=0.05), unless otherwise stated. Orientation data were transformed into polar coordinates for statistical analysis (Batschelet, E., AIBS Mono. 1, 1965).

Table 1. Physical characteristics of Kestrel nests and a sample of unused cavities (mean and range).

	Nest Hole								Tree			
	Hole Width (cm)		Hole Height (cm)		Orientation (degrees)		Height from Ground (cm)		Diameter at Cavity (cm)		Diameter at Breast Height (cm)	
Building Nests	11.9	(6-23)	10.2	(5.5-15)	288	(95-350)	5.9	(2.4-9.0)	-	-	-	-
Tree Nests	7.9	(7-10.5)	10.9	(7-30	131	(70-330)	7.8	(4.3-14)	36.4	(23-53.5)	74.1	(39.3-114)
Unused cavities	7.6	(4-28)	8.4	(3.5-34)	160	(0-340)	5.8	(1.7-14)	39.5	(19-77)	62.9	(10.5-114.5)

Results

Building and tree nests differed only in orientation (p=0.025). The tree nests tend to face southeast and the building nests, westerly. Kestrels did not appear to be affected by human activity in building nests, since all building sites had human occupants during the nesting season, and Kestrels successfully fledged young from them. The use of artificial nesting sites may be due either to a shortage of available natural sites or to a preference for these sites.

The sampled woodpecker cavities were similar to the Kestrel nests in cavity orientation. Other studies described similar south and east orientation (Inouye, D.W., Condor 78:101-102, 1976). Woodpeckers and Kestrels obtained an advantage in this orientation through protection from northerly storms or increased solar insolation (McComb, W.C., and R.E. Noble, J. Wildl. Manage. 45:284-289).

Kestrel nests differed from unused cavities by having higher cavity entrance and larger tree dbh (p=0.025, paired t-test). Since these two parameters are correlated (higher nests are in larger trees), a similar trend was expected. When cavity entrances smaller than the smallest Kestrel nest hole (7 cm) were removed from the sample, there was no difference in hole size between used and unused cavities.

Conclusions

Optimal cavity nesting strategy predicts selection of higher nests and smaller holes to protect the nest from ground based predators (Preston, F.W. and R.T. Norris, Ecology 28:241-273, 1947). This study demonstrates a selection by Kestrels for higher nests and larger trees from those available, but did not detect selection for hole size. The selection pressures affecting woodpecker cavity orientation have a similar effect on Kestrel nest orientation.

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